

**SCIENTIFIC COUNCIL MEETING – JUNE 2007****Spanish Research Report for 2006**

by

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All effort and catch information in this Report are based on information from NAFO observers on board. In 2006 information from 2769 days was available while total effort of the Spanish fleet in NAFO Regulatory Area was 2826 days (98% coverage). Estimates from NAFO observers of Spanish catches by species and Division in 2006 are presented in Table 1. The split by species of grenadiers were calculated based upon the percentage observed by the IEO scientific observers.

In addition to NAFO observers, IEO scientific observers were on board. All length, age and biological information presented in this paper is based on sampling carried out by IEO observers: in 2006, more than 400 samples were taken, with more the 74 000 individuals of different species examined. These samples were made in 355 working days that it means 12 % of the Spanish total effort.

**SUBAREA 1 and 2****A. Status of the fisheries**

A total of 11 Spanish pelagic trawlers operated in NAFO Subarea 1 and 2 (Div. 1F and 2J) during 2006, amounting 263 days of fishing effort which part of them was carried out within the EEZ of Greenland. Catches in Div. 1F and 2J were 3186 tons of pelagic redfish (*Sebastes mentella*) (Table 1). Table 2 shows effort and catches by quarter and Division for this fishery.

More complete information about this fishery can be found in ICES North-Western Working Group Reports.

**SUBAREA 3****A. Status of the fisheries**

A total of 23 Spanish trawlers operated in NAFO Regulatory Area, Div. 3LMNO, during 2006, amounting to 2 557 days (44 044 hours) of fishing effort. This implies a decrease in 2006 of 59% compared to 2003 effort (Table 3). Total catches (Table 1) for all species combined in Div. 3LMNO were 16 957 tons in 2006, compared to 18 855 tons in 2005.

Table 4 shows the effort (hours) by quarter and Division and their percentage. Table 5 presents the percentage of the effort by Division and mesh size.

These tables show that the Spanish fleet has three different fisheries in NAFO Subarea 3 characterized by different mesh size, target species, depth and fishing area. The Spanish fleet effort in NAFO area is mainly directed to

Greenland halibut (mostly in Div. 3LM), alternating with the skate fishery in the second half of the year (Div. 3NO), shrimp fishery (Div. 3LM), and redfish (Div. 3O). In Div. 3L, most of the effort was performed using cod-end mesh size of 135 mm, indicating that the fleet targeted Greenland halibut. In the first half of the year a small part of the effort was directed to the shrimp fishery. Regarding Div. 3M, most of the effort was carried out using 135 mm cod-end mesh size targeting Greenland halibut. The 17% of the fishing effort was carried out using 40 mm cod-end mesh size directed to the shrimp fishery. In Div. 3N and during the first half of the year, fishing was performed using 135 mm cod-end mesh size, which indicates that the fleet targeted Greenland halibut. However, since July a part of the fleet using 280 mm mesh size moved to depths of less than 200 m, where the skate fishery took place. Fishing effort in Div. 3O was limited (5%) and targeted redfish, using mainly 135 mm mesh size.

In addition to NAFO observers (NAFO Observers Program), 6 IEO scientific observers were onboard vessels, comprising a total of 355 observed fishing days, around 13% coverage of the total effort. Besides recording catches, discards, and effort, these observers carried out biological sampling of the main species taken in the catch. This includes recording weight at length, sex-ratio, maturity stages, performing stomach contents analyses, and collecting material for reproductive studies about Greenland halibut, roughhead grenadier and American plaice. Otoliths of these three species were also taken for age determination. Length and age distributions presented in this paper are based on sampling carried out by these observers. Parameters used for the length-weight relationships are shown by species in Table 6.

### **Cod (Div. 3NO; Div. 3M)**

Main catches of this species were taken as by-catch in the Greenland halibut fishery and skate fishery in Div. 3N. Very few catches were taken in Div. 3LMO.

There is not length distribution samplings for this species.

### **Redfish (Div. 3LN; Div. 3M; Div. 3O)**

Most of the catches in Div. 3LN and 3M were taken as by-catch in the Greenland halibut fishery. In Div. 3M a small part of the catches were taken as by-catch in the Shrimp fishery. A directed fishery for this species took place in Div. 3O mostly in the second half of this year. Catches have reached 1302 ton in this Division.

Table 7 shows the length distribution for Div. 3LN, all samples were taken in Division 3L. Catches length distribution for Div. 3M and 3O are presented in Table 8 and Table 9, respectively.

### **American plaice (Div. 3LNO; Div. 3M)**

Most catches were taken in Div. 3LNO as by-catch of the Greenland halibut and skate fisheries. Catches in Div. 3M only amounted 33 tons and were taken as by-catch of the Greenland halibut fishery.

Length distributions for Div. 3LNO are presented in Table 10. There is not available length distributions for Division 3M.

### **Witch flounder (Div. 2J and 3KL; Div. 3NO; Div. 3M)**

This species is taken as by-catch in the Greenland halibut fishery. This year, there was only one length distribution sample in Division 3L (Table 11).

### **Yellowtail flounder (Div. 3LNO)**

Most of the catches were taken in Div. 3N as by-catch in the skate fishery. There was not length distributions available for this species.

### **Greenland halibut (Subareas 2 and 3)**

Greenland halibut is the main target species for the Spanish fleet in NAFO area, with most of the catches taken in the Flemish Pass area (Div. 3LM) at depths more than 700 meters. The mesh size used for this fishery was equal to or greater than 135 mm. Tables 12, 13 and 14 show length distributions of Spanish catches by Division. Total age composition, mean weight and mean length at age for Div. 3LMNO are presented in Table 15. Most of the Greenland halibut catches corresponds to ages 5 to 7; a range similar to the one observed in previous years.

### **Thorny skate (Div. 3LNO; Div. 3M)**

Catches comprise many species of skate, thus the catch of skate in Table 1 refers to *Raja spp.* Most of the catches were taken in Div. 3N at depths less than 200 meters, where a fishery directed to thorny skate took place mainly in the second semester of the year, using 280 mm mesh size. Skate catches in Div. 3LM were smaller than those in Div. 3NO and they were by-catch of the Greenland halibut fishery (135 mm cod-end).

Table 16 shows the total catches length distributions of Div. 3LNO, all samples were taken in Division 3N. There was not length distributions available for Division 3M.

### **Roughhead grenadier (Subarea 2 and 3)**

Roughhead grenadier is the main species taken as by-catch in the Greenland halibut fishery, and most of the 2006 catches were taken in Div. 3LM. Tables 17 and 18 show length distributions of Spanish catches by Division and length distributions of Spanish total catch for Div. 3LMNO. Age distributions, mean weight and mean length at age of the total catch for Div. 3LMNO are presented in Table 19. Most of the Roughhead grenadier catches in 2006 were based on ages 6 to 11.

### **White hake (Div. 3LMNO)**

Catches in 2006 are in the same level as before 2000. Catches of this species in 2006 are by-catch of different fisheries. In Div. 3LM they are by-catch of the Greenland halibut fishery and by-catch of the redfish fishery in Div. 3O. There was not length distribution samplings available in 2006.

## **(B) Research studies**

The Spanish bottom trawl survey in NAFO Regulatory area Div. 3NO was conducted in June 2006 on board R/V *Vizconde de Eza* using Campelen gear with a stratified design. A total of 120 valid hauls were carried out up to a depth of 1 450 m. The results of the Spanish 3NO bottom trawl survey for all the period studied (1995-2006), including biomass indices with their errors and length distributions, as well as the calculated biomass based on conversion of length frequencies for Greenland halibut and American plaice; Atlantic cod and yellowtail flounder; Thorny skate, white hake and roughhead grenadier are presented as Scientific Council Research documents.

Feeding studies on the main species continued to be conducted, and material for histology (Cod, American plaice, Greenland halibut and redfish) and aging (Cod, American plaice, Greenland halibut, redfish, Roughhead grenadier, Yellowtail and Which flounder) studies were taken.

Ninety two hydrographic profile samplings were made in a depth range of 44 - 1393 m.

In 2003 it was decided to extend the Spanish 3NO survey toward Div. 3L (Flemish Pass), and 39 and 50 valid hauls were carried out in 2003 and 2004 respectively. In 2006 a total of 100 valid hauls were made by the R/V *Vizconde de Eza*, covering 24 strata of the Flemish Pass area in Div. 3L (Fig. 1), using a Campelen survey gear up to 1451 meters depth, and following the same procedure as in previous years. Total biomass, calculated by the swept area method, for the main species is shown in the Table 20. The results of this extension will be present in the future.

Oceanography and feeding studies on the main species continued to take place. Survey results for Div. 3LNO of the northern shrimp (*Pandalus borealis*) were presented in SCR 06/69.

The EU bottom trawl survey in Flemish Cap (Div. 3M) was carried out on board R/V Vizconde de Eza using the usual survey gear (Lofoten) from June 28th to July 27th 2006. The area surveyed was Flemish Cap Bank to depths up to 800 fathoms (1 400 m) following the same procedure as in previous years. The number of hauls was 181 and two of them were nulls. Survey results including abundance indices of the main commercial species and age distributions for cod, redfish, American plaice, roughhead grenadier and Greenland halibut are presented as Scientific Council Research documents. Flemish Cap survey results for northern shrimp (*Pandalus borealis*) were presented in SCR 06/66.

Feeding studies on the main species continued to be performed, and samples for histological assessment of sexual maturity of cod, redfish, Greenland halibut and Roughhead grenadier were also taken.

Oceanography studies continued to take place.

## **SUBAREA 6**

### **A. Status of the fisheries**

One Spanish trawler operated in January 2006 in NAFO Subarea 6, Division 6G, amounting to 6 days of fishing effort. The most important species in the catches were *Aphanopus carbo* and *Beryx spp* in this order. There were not IEO scientific observer on board and, therefore, biological sampling was not available.

## **REFERENCES**

Casas, J.M. Northern shrimp (*Pandalus borealis*) on Flemish Cap Survey 2006. NAFO SCR Doc. 06/66.

Casas, J.M., and J. Teruel. Northern shrimp (*Pandalus borealis*, Krøyer) in Spanish bottom trawl survey 2006 in NAFO Divisions 3LNO. NAFO SCR Doc. 06/69.

**Table 1.** Spanish Catches (ton) in NAFO Area in 2006 by Division, based on NAFO Observers information.

Code	English name	Scientific_name	Division							Total
			1F	2J	3L	3M	3N	3O	6G	
GHL	Greenland halibut	<i>Reinhardtius hippoglossoides</i>	0	0	3962	1309	548	40	0	5859
SKA	Raja rays nei	<i>Raja spp</i>	0	0	231	129	3353	158	0	3870
RED	Atlantic redfishes nei	<i>Sebastes spp</i>	3181	5	102	581	48	1302	0	2274
PRA	Northern prawn	<i>Pandalus borealis</i>	0	0	358	997	0	0	0	1355
RHG	Roughhead grenadier	<i>Macrourus berglax</i>	0	0	765	455	109	10	0	1339
PLA	American plaice	<i>Hippoglossoides platessoides</i>	0	0	113	33	241	52	0	439
HKR	Red hake	<i>Urophycis chuss</i>	0	0	232	86	13	1	0	332
HKW	White hake	<i>Urophycis tenuis</i>	0	0	83	38	72	92	0	286
YEL	Yellowtail flounder	<i>Limanda ferruginea</i>	0	0	31	1	198	23	0	253
WIT	Witch flounder	<i>Glyptocephalus cynoglossus</i>	0	0	81	51	63	25	0	220
BSF	Black scabbardfish	<i>Aphanopus carbo</i>	0	0	0	0	0	0	165	165
CAT	Wolffishes	<i>Anarhichas spp</i>	0	0	117	24	13	2	0	156
COD	Atlantic cod	<i>Gadus morhua</i>	0	0	22	18	99	11	0	150
RJR	Starry ray	<i>Raja radiata</i>	0	0	0	0	149	0	0	149
BYS	Splendid alfonso	<i>Beryx splendens</i>	0	0	0	0	0	0	130	130
RNG	Roundnose grenadier	<i>Coryphaenoides rupestris</i>	0	0	35	81	2	0	0	118
GSK	Greenland shark	<i>Somniosus microcephalus</i>	0	0	42	21	9	10	0	83
DGX	Dogfish sharks nei	<i>Squalidae</i>	0	0	27	10	34	8	0	78
HAL	Atlantic halibut	<i>Hippoglossus hippoglossus</i>	0	0	7	3	30	6	0	46
SQI	Northern shortfin squid	<i>Illex illecebrosus</i>	0	0	0	0	1	25	0	26
ANT	Blue antimora	<i>Antimora rostrata</i>	0	0	15	5	0	0	0	20
SPW	Sperm whale	<i>Physeter catodon</i>	0	0	0	15	0	0	0	15
HKS	Silver hake	<i>Merluccius bilinearis</i>	0	0	4	1	7	1	0	13
SKX	Sharks, rays, skates, etc.	<i>Elasmobranchii</i>	0	0	19	2	1	0	0	22
EPI	Black cardinal fish	<i>Epigonus telescopus</i>	0	0	0	0	1	1	7	10
	Others		1	0	23	11	45	12	0	118
	Total		237	5	6270	3872	5037	1779	303	17527

**Table 2.** Fishing effort (days) of the Spanish fleet, by quarter and Division and redfish catches (tons) by quarter and Division in NAFO SA 1 and 2.

Div.	Effort (days)				
	1st Q	2nd Q	3rd Q	4th Q	Total
1F		1	260	1	262
2J			1		1

  

Div.	Redfish Catches (tons)				
	1st Q	2nd Q	3rd Q	4th Q	Total
1F		2	3170	9	3181
2J			5		5

**Table 3.** Fishing effort (hours) of the Spanish fleet in 2006 in Divisions 3LMNO by year, as well as percentage of effort reduction compare with 2003.

3LMNO	2003	2004	2005	2006
Effort (Hours)	106821	76028	60128	44044
Effort reduction	0%	29%	44%	59%

**Table 4.** Fishing effort (hours) of the Spanish fleet in 2006, by quarter and Division, as well as percentage of effort by quarter and Division.

Div.	units	1st Q	2nd Q	3rd Q	4th Q	Total	%
3L	Hours	7366	3848	5467	5378	22060	50%
3M	Hours	4447	3329	1711	1743	11230	26%
3N	Hours	777	300	4022	3547	8646	20%
3O	Hours	489	177	888	530	2084	5%
	Total Hours	13078	7654	12087	11199	44019	100%
	%	30%	17%	27%	25%	100%	

**Table 5-.** Percentage of the effort in SA 3 by mesh size, quarter and Division.

Div.	Mesh Size	1st Q	2nd Q	3rd Q	4th Q	Total
3L	<90 mm	4%				1%
	100-200 mm	96%	100%	100%	100%	99%
	>200 mm					
3M	<90 mm	8%	14%	18%	45%	17%
	100-200 mm	92%	86%	82%	55%	83%
	>200 mm					
3N	<90 mm					
	100-200 mm	94%	100%	34%	34%	42%
	>200 mm	6%		66%	66%	58%
3O	<90 mm					
	100-200 mm	68%	100%	100%	99%	92%
	>200 mm	32%			1%	8%

**Table 6.** Parameters of the length-weight relationship ( $W(g) = a \cdot L(cm)^b$ ) by species.

Species	a	b
Greenland halibut	0.00740	3.0310
Redfish	0.01900	2.9060
Roughhead grenadier	0.11390	2.8921
Witch flounder	0.00220	3.2995
American plaice	0.00600	3.1127
Cod	0.00800	3.0400
Roundnose grenadier	0.20400	2.9636
Yellowtail Flounder	0.00710	3.0903
Skate	0.01115	2.9471
<i>S. mentella</i>	0.02473	2.8376
White Hake	0.00540	3.0938

**Table 7.** Length distribution of 3LN Spanish redfish catches by Division.

<b>Redfish</b>	<b>3LN</b>			
<b>Length (cm)</b>	<b>Males</b>	<b>Females</b>	<b>Ind.</b>	<b>Total</b>
<b>15</b>	0	0	0	0
<b>16</b>	0	0	0	0
<b>17</b>	0	0	1195	1195
<b>18</b>	0	0	0	0
<b>19</b>	1550	0	0	1550
<b>20</b>	3566	0	0	3566
<b>21</b>	1195	3061	0	4256
<b>22</b>	7074	355	0	7429
<b>23</b>	23343	11953	0	35296
<b>24</b>	32141	57426	0	89567
<b>25</b>	22738	36479	0	59217
<b>26</b>	8962	8680	0	17642
<b>27</b>	5664	18191	0	23855
<b>28</b>	25543	12268	0	37811
<b>29</b>	29620	27136	0	56756
<b>30</b>	30448	17784	0	48232
<b>31</b>	17125	20864	0	37989
<b>32</b>	11165	17254	0	28419
<b>33</b>	6989	5939	0	12928
<b>34</b>	7180	5206	0	12386
<b>35</b>	4894	3368	0	8262
<b>36</b>	1027	1354	0	2381
<b>37</b>	905	1433	0	2338
<b>38</b>	1361	1339	0	2700
<b>39</b>	313	377	0	690
<b>40</b>	94	0	0	94
<b>41</b>	0	0	0	0
<b>42</b>	0	0	0	0
<b>43</b>	0	0	0	0
<b>44</b>	0	0	0	0
<b>45</b>	0	0	0	0
<b>46</b>	0	401	0	401
<b>47</b>	0	94	0	94
<b>TOTAL</b>	242897	250962	1195	495054
<b>Ind. Sampled</b>	519	460	1	980
<b>Samples</b>				13
<b>Catch (ton)</b>				150



**Table 8.** Redfish 3M stock Spanish catches length distribution.

<b>Redfish</b>	<b>3M</b>			
<b>Length (cm)</b>	<b>Males</b>	<b>Females</b>	<b>Ind.</b>	<b>Total</b>
<b>10</b>	873	0	0	873
<b>11</b>	0	0	0	0
<b>12</b>	873	0	0	873
<b>13</b>	1745	0	0	1745
<b>14</b>	1242	369	0	1611
<b>15</b>	738	369	0	1107
<b>16</b>	369	738	0	1107
<b>17</b>	5802	5221	0	11023
<b>18</b>	8618	1845	0	10463
<b>19</b>	8801	2309	0	11110
<b>20</b>	16417	13987	0	30404
<b>21</b>	11722	25421	0	37143
<b>22</b>	44640	91237	0	135877
<b>23</b>	104715	144659	0	249374
<b>24</b>	184931	143566	0	328497
<b>25</b>	83146	179416	0	262562
<b>26</b>	80004	41285	0	121289
<b>27</b>	45549	55376	0	100925
<b>28</b>	54570	71218	0	125788
<b>29</b>	55830	23112	0	78942
<b>30</b>	70566	38786	0	109352
<b>31</b>	22915	45009	0	67924
<b>32</b>	12594	32670	0	45264
<b>33</b>	11417	30781	0	42198
<b>34</b>	5222	22726	0	27948
<b>35</b>	8023	23071	0	31094
<b>36</b>	1107	8179	0	9286
<b>37</b>	8535	10319	0	18854
<b>38</b>	5946	4115	0	10061
<b>39</b>	1107	369	0	1476
<b>40</b>	1866	2235	0	4101
<b>41</b>	0	6550	0	6550
<b>42</b>	0	1107	0	1107
<b>43</b>	0	5792	0	5792
<b>44</b>	0	738	0	738
<b>45</b>	0	2604	0	2604
<b>46</b>	0	369	0	369
<b>47+</b>	0	1476	0	1476
<b>TOTAL</b>	859883	1037024	0	1896907
<b>Ind. Sampled</b>	577	619	0	1196
<b>Samples</b>				7
<b>Catch (ton)</b>				581

**Table 9.** Redfish 30 stock Spanish catches length distribution.

<b>Redfish</b>	<b>30</b>			
<b>Length (cm)</b>	<b>Males</b>	<b>Females</b>	<b>Ind.</b>	<b>Total</b>
10	0	0	0	0
11	0	0	0	0
12	0	0	0	0
13	0	0	0	0
14	0	0	0	0
15	0	0	0	0
16	0	0	0	0
17	469	0	0	469
18	0	1525	0	1525
19	14641	1525	0	16166
20	150216	327625	635	478476
21	282998	553781	0	836779
22	346466	728153	0	1074619
23	304934	717568	0	1022502
24	221166	718611	0	939777
25	164362	715865	0	880227
26	133605	632841	4092	770538
27	11151	316784	0	327935
28	4857	218779	0	223636
29	0	132521	0	132521
30	0	124155	0	124155
31	0	70390	0	70390
32	0	27251	0	27251
33	0	18897	0	18897
34	0	3998	0	3998
35	0	5572	0	5572
36	0	0	0	0
37	0	0	0	0
38	0	3998	0	3998
39	0	0	0	0
40	0	0	0	0
41	0	0	0	0
42	0	0	0	0
43	0	0	0	0
44	0	0	0	0
45	0	0	0	0
<b>TOTAL</b>	1634865	5319839	4727	6959431
<b>Ind. Sampled</b>	929	2477	3	3409
<b>Samples</b>				17
<b>Catch (ton)</b>				1302

**Table 10.** American plaice 3LNO stock Spanish catches length distribution.

American plaice	3LNO			
Length (cm)	Males	Females	Ind.	Total
25	535	0	0	535
26	1792	1439	0	3231
27	904	66	0	970
28	5266	5261	904	11431
29	2399	8849	0	11248
30	2393	12302	0	14695
31	5783	12578	0	18361
32	18777	13988	0	32765
33	17518	18772	0	36290
34	12069	16582	0	28651
35	10691	18075	0	28766
36	15280	22189	0	37469
37	10572	32623	0	43195
38	9455	27241	0	36696
39	4363	24442	0	28805
40	4124	28619	0	32743
41	1266	29521	0	30787
42	2442	33805	0	36247
43	1074	23949	0	25023
44	0	22167	0	22167
45	464	14931	0	15395
46	169	16177	0	16346
47	0	10379	0	10379
48	0	10238	0	10238
49	0	11849	0	11849
50	0	10735	0	10735
51	535	8826	0	9361
52	0	6308	0	6308
53	0	8931	0	8931
54	0	4151	0	4151
55	621	7526	0	8147
56	0	5125	0	5125
57	466	5651	0	6117
58	466	5748	0	6214
59	155	5410	0	5565
60	310	3455	0	3765
61	0	2418	0	2418
62	155	2112	0	2267
63	0	1922	0	1922
64	0	2112	0	2112
65	0	2171	0	2171
66	0	553	0	553
67	0	155	0	155
68	0	513	0	513
69	0	155	0	155
70	0	464	0	464
TOTAL	130044	500483	904	631431
Ind. Sampled	332	1800	1	2133
Samples				21
Catch (ton)				406

**Table 11.** Witch flounder Spanish catches length distribution for Div. 3L.

<b>Witch flounder</b>		<b>3L</b>			
<b>Length (cm)</b>	<b>Males</b>	<b>Females</b>	<b>Ind.</b>	<b>Total</b>	
30	0	0	0	0	
31	0	0	0	0	
32	0	827	0	827	
33	0	827	0	827	
34	0	3306	0	3306	
35	827	2893	0	3720	
36	0	1653	0	1653	
37	1240	4133	0	5373	
38	3306	2480	0	5786	
39	2893	6199	0	9092	
40	1240	4546	0	5786	
41	827	6199	0	7026	
42	827	5372	0	6199	
43	2480	8265	0	10745	
44	1653	3719	0	5372	
45	2480	1653	0	4133	
46	827	4133	0	4960	
47	413	3306	0	3719	
48	0	1240	0	1240	
49	0	1240	0	1240	
50	0	827	0	827	
51	0	1240	0	1240	
52	0	0	0	0	
53	0	0	0	0	
54	0	0	0	0	
55	0	0	0	0	
56	0	827	0	827	
57	0	0	0	0	
58	0	0	0	0	
59	0	0	0	0	
60	0	0	0	0	
<b>TOTAL</b>	19013	64885	0	83898	
<b>Ind. Sampled</b>	46	157	0	203	
<b>Samples</b>				1	
<b>Catch (ton)</b>				81	

**Table 12.** Greenland halibut Spanish catches length distribution for Div. 3L and 3M.

Greenland Halibut Length (cm)	3L				3M			
	Males	Females	Ind.	Total	Males	Females	Ind.	Total
25-	0	271	0	271	0	0	0	0
26	238	171	0	409	0	0	0	0
27	0	0	0	0	0	0	0	0
28	650	0	0	650	0	0	0	0
29	835	314	0	1149	0	0	0	0
30	2064	2084	0	4148	0	337	0	337
31	4069	2906	286	7261	147	197	0	344
32	6997	7164	256	14417	1044	144	0	1188
33	13931	12393	912	27236	1803	1553	0	3356
34	17181	19953	279	37413	3265	2479	0	5744
35	20856	26451	399	47706	4960	3180	0	8140
36	33794	33228	256	67278	4872	5126	0	9998
37	42090	41439	891	84420	8783	8470	0	17253
38	63559	74804	1186	139549	11752	13810	0	25562
39	72028	113293	2541	187862	16140	13316	0	29456
40	102916	167324	1020	271260	17244	21398	0	38642
41	114830	218111	4162	337103	27409	33309	0	60718
42	126776	259869	2659	389304	41468	52883	0	94351
43	127562	274690	3131	405383	49152	67513	0	116665
44	132001	330935	1331	464267	51622	62826	0	114448
45	117388	325355	2281	445024	58315	71931	0	130246
46	105010	310374	597	415981	45548	69507	0	115055
47	81895	276162	916	358973	46537	77581	0	124118
48	78215	236240	893	315348	34175	80165	0	114340
49	64894	191390	319	256603	27354	62713	0	90067
50	45095	143972	256	189323	23012	50775	0	73787
51	31757	107366	0	139123	19404	47123	0	66527
52	22123	89738	319	112180	14121	41717	0	55838
53	14468	63663	0	78131	10859	36924	0	47783
54	11797	51209	0	63006	8746	26401	0	35147
55	7582	49620	0	57202	6310	24555	0	30865
56	3621	41210	0	44831	4258	21025	0	25283
57	3395	27891	0	31286	3850	18103	0	21953
58	3751	20230	0	23981	2645	14514	0	17159
59	2325	16672	0	18997	3108	9645	0	12753
60	2346	12942	0	15288	2673	12232	0	14905
61	375	10631	0	11006	1309	10083	0	11392
62	402	9208	0	9610	723	8475	0	9198
63	385	1961	0	2346	245	7885	0	8130
64	133	3437	0	3570	140	3926	0	4066
65	130	1714	0	1844	0	3679	0	3679
66	0	734	0	734	0	2687	0	2687
67	0	595	0	595	0	1401	0	1401
68	0	502	0	502	0	1595	0	1595
69	0	453	0	453	0	1912	0	1912
70	0	1726	0	1726	0	686	0	686
71	130	232	0	362	0	718	0	718
72	0	144	0	144	0	607	0	607
73	0	74	0	74	0	633	0	633
74	0	1041	0	1041	0	545	0	545
75	0	321	0	321	0	435	0	435
76	55	98	0	153	0	136	0	136
77	0	0	0	0	0	629	0	629
78	0	439	0	439	0	233	0	233
79	0	53	0	53	0	0	0	0
80+	0	2957	0	2957	0	572	0	572
<b>TOTAL</b>	1479649	3585754	24890	5090293	552993	998289	0	1551282
<b>Ind. Sampled</b>	9066	21347	100	30513	2917	5357	0	8274
<b>Samples</b>				149				42
<b>Catch (ton)</b>				3962				1309

**Table 13.** Greenland halibut Spanish catches length distribution for Div. NO

Greenland Halibut	3NO			
Length (cm)	Males	Females	Ind.	Total
30	0	0	0	0
31	0	0	0	0
32	0	0	0	0
33	0	0	0	0
34	0	2205	0	2205
35	0	0	0	0
36	0	4312	0	4312
37	2205	0	0	2205
38	4312	2205	0	6517
39	4411	2205	0	6616
40	6616	8625	0	15241
41	3160	4411	0	7571
42	9777	23965	0	33742
43	12937	13036	0	25973
44	17348	44473	0	61821
45	18204	51188	0	69392
46	11982	51090	0	63072
47	21661	43518	0	65179
48	6518	47634	0	54152
49	7473	36803	0	44276
50	13134	15143	0	28277
51	6518	15143	0	21661
52	2205	30384	0	32589
53	4411	16393	0	20804
54	2205	6518	0	8723
55	4411	12081	0	16492
56	1053	7571	0	8624
57	2205	5366	0	7571
58	6616	6616	0	13232
59	0	1053	0	1053
60	2205	4411	0	6616
61	0	1053	0	1053
62	0	3259	0	3259
63	0	2107	0	2107
64	0	3259	0	3259
65	0	0	0	0
66	0	0	0	0
67	0	0	0	0
68	0	1053	0	1053
69	0	2107	0	2107
70	0	0	0	0
71	0	0	0	0
72	0	0	0	0
73	0	0	0	0
74	0	0	0	0
75	0	0	0	0
76	0	0	0	0
77	0	0	0	0
78	0	0	0	0
79	0	0	0	0
80	0	1053	0	1053
TOTAL	171567	470240	0	641807
Ind. Sampled	106	290	0	396
Samples				2
Catch (ton)				588

**Table 14.** Greenland halibut Subarea 2 Div. 3LMNO stock Spanish catches length distribution.

Greenland Halibut Length (cm)	3LMNO			Total
	Males	Females	Ind.	
25-	0	271	0	271
26	238	171	0	409
27	0	0	0	0
28	650	0	0	650
29	835	314	0	1149
30	2064	2421	0	4485
31	4216	3103	286	7605
32	8041	7308	256	15605
33	15734	13946	912	30592
34	20446	24637	279	45362
35	25816	29631	399	55846
36	38666	42666	256	81588
37	53078	49909	891	103878
38	79623	90819	1186	171628
39	92579	128814	2541	223934
40	126776	197347	1020	325143
41	145399	255831	4162	405392
42	178021	336717	2659	517397
43	189651	355239	3131	548021
44	200971	438234	1331	640536
45	193907	448474	2281	644662
46	162540	430971	597	594108
47	150093	397261	916	548270
48	118908	364039	893	483840
49	99721	290906	319	390946
50	81241	209890	256	291387
51	57679	169632	0	227311
52	38449	161839	319	200607
53	29738	116980	0	146718
54	22748	84128	0	106876
55	18303	86256	0	104559
56	8932	69806	0	78738
57	9450	51360	0	60810
58	13012	41360	0	54372
59	5433	27370	0	32803
60	7224	29585	0	36809
61	1684	21767	0	23451
62	1125	20942	0	22067
63	630	11953	0	12583
64	273	10622	0	10895
65	130	5393	0	5523
66	0	3421	0	3421
67	0	1996	0	1996
68	0	3150	0	3150
69	0	4472	0	4472
70	0	2412	0	2412
71	130	950	0	1080
72	0	751	0	751
73	0	707	0	707
74	0	1586	0	1586
75	0	756	0	756
76	55	234	0	289
77	0	629	0	629
78	0	672	0	672
79	0	53	0	53
80+	0	4582	0	4582
TOTAL	2204209	5054283	24890	7283382
Ind. Sampled	12089	26994	100	39183
Samples				193
Catch (ton)				5859

**Table 15.** Greenland halibut Subarea 2 Div. 3LMNO stock Spanish catches ages distribution, mean weight (g) and mean length (cm) by age.

Abundance					Mean Weight (gr)				
Age	Males	Females	Ind.	Total	Age	Males	Females	Ind.	Total
2		0	417	417	2		143		143
3	3104	684	32	3821	3	248	220	303	243
4	54937	59456	1382	115775	4	368	371	336	369
5	512738	882155	8504	1403398	5	576	611	544	598
6	1000831	2130676	11990	3143497	6	729	761	675	751
7	527918	1411153	2885	1941956	7	972	1010	872	1000
8	66892	296791	86	363769	8	1309	1356	1157	1347
9	21177	121429	10	142616	9	1561	1518	1211	1524
10	14128	77862		91990	10	1792	1856		1846
11	1790	38815		40605	11	1942	2125		2117
12	547	19296		19843	12	2156	2407		2400
13	93	7589		7682	13	3298	3003		3007
14	46	2427		2473	14	3508	3314		3318
15	9	2574		2584	15	3089	4163		4159
16		1762		1762	16		4394		4394
17		598		598	17		4425		4425
18		398		398	18		4425		4425
19+		199		199	19+		4425		4425

  

Mean Length (cm)				
Age	Males	Females	Ind.	Total
2		25.9		25.9
3	30.9	29.9	33.2	30.8
4	35.3	35.4	34.2	35.3
5	40.8	41.7	40.1	41.3
6	44.2	44.9	43.1	44.7
7	48.6	49.3	46.9	49.1
8	53.7	54.4	51.7	54.3
9	57.0	56.5	52.5	56.5
10	59.7	60.4		60.3
11	61.3	63.1		63.0
12	63.4	65.7		65.6
13	73.0	70.6		70.7
14	74.5	73.1		73.1
15	71.5	78.8		78.8
16		80.3		80.3
17		80.5		80.5
18		80.5		80.5
19+		80.5		80.5



**Table 16.** Skates Spanish catches length distribution for Div. 3LNO.

Skates Length (cm)	Males	3LNO Females	Ind.	Total
30-	356	0	0	356
31	1057	1388	0	2445
32	555	1084	0	1639
33	762	701	0	1463
34	275	388	0	663
35	444	1440	0	1884
36	2395	701	0	3096
37	1935	1368	0	3304
38	3379	3421	0	6800
39	2922	2165	0	5087
40	2903	4507	0	7410
41	3434	4232	0	7666
42	2723	3781	0	6505
43	5572	5350	0	10922
44	9691	4605	0	14297
45	6687	6491	0	13177
46	9826	9905	0	19731
47	9702	10597	0	20299
48	12652	15390	0	28042
49	8777	15295	0	24072
50	14719	15848	0	30567
51	17412	15302	0	32713
52	16057	18822	0	34879
53	20564	21367	0	41932
54	23862	24589	0	48451
55	26987	22020	0	49007
56	24904	28385	0	53290
57	26339	21033	0	47372
58	26638	31765	0	58403
59	24474	23685	0	48159
60	24520	22315	0	46834
61	25963	24139	0	50102
62	26878	28626	0	55504
63	19715	23194	0	42909
64	25764	25048	0	50813
65	19379	26462	0	45841
66	22743	22575	0	45318
67	21889	22480	0	44369
68	24836	20805	0	45642
69	20823	14945	0	35768
70	25439	20904	0	46344
71	18267	15293	0	33560
72	18143	15695	0	33838
73	17736	10630	0	28366
74	19177	14919	0	34096
75	17173	9876	0	27049
76	17285	7382	0	24667
77	15191	4744	0	19935
78	14116	4571	0	18688
79	7821	1732	0	9553
80	13601	1549	0	15149
81	13150	760	0	13910
82	13438	983	0	14420
83	7613	200	0	7813
84	5959	0	0	5959
85	3796	275	0	4071
86	3593	555	0	4148
87	2152	0	0	2152
88	2347	126	0	2473
89	1019	0	0	1019
90+	3077	0	0	3077
<b>TOTAL</b>	<b>780607</b>	<b>656409</b>	<b>0</b>	<b>1437016</b>
<b>Ind. Sampled</b>	<b>2695</b>	<b>2361</b>	<b>0</b>	<b>5056</b>
<b>Samples</b>				<b>25</b>
<b>Catch (ton)</b>				<b>3742</b>

**Table 17.** Roughhead grenadier Spanish catches length distribution by Division.

Roughhead G. 3L					Roughhead G. 3M				
Length (cm)	Males	Females	Ind.	Total	Length (cm)	Males	Females	Ind.	Total
4	0	0	0	0	4	0	0	110	110
5	0	0	0	0	5	0	0	503	503
6	0	0	0	0	6	0	0	197	197
7	0	0	0	0	7	0	98	197	295
8	231	293	0	524	8	98	0	197	295
9	186	278	0	464	9	1099	0	98	1197
10	6943	6110	1283	14337	10	3986	96	0	4082
11	19735	11089	180	31004	11	6612	4509	0	11121
12	30922	23432	1218	55572	12	10167	13220	0	23387
13	32288	29804	0	62092	13	13922	14353	0	28275
14	45820	35788	0	81608	14	18519	17384	0	35903
15	65225	53998	0	119223	15	30291	16719	0	47010
16	91872	97436	0	189308	16	28156	17181	0	45337
17	95772	82783	0	178555	17	37564	12352	0	49916
18	105164	94406	0	199570	18	41895	32794	0	74689
19	80847	69317	0	150164	19	26537	26329	0	52866
20	30408	39642	0	70050	20	16004	26292	0	42296
21	7646	20118	0	27764	21	7775	19766	0	27541
22	5969	12121	0	18090	22	4797	20743	0	25540
23	3031	9584	0	12615	23	2838	15295	0	18133
24	720	8972	0	9692	24	1370	15016	0	16386
25	2335	4709	0	7043	25	2741	15465	0	18206
26	720	4057	0	4777	26	0	9616	0	9616
27	7325	3437	0	10762	27	0	4884	0	4884
28	2935	9453	0	12389	28	0	8045	0	8045
29	2279	4270	0	6549	29	0	4579	0	4579
30	0	1426	0	1426	30	0	5158	0	5158
31	1218	1146	0	2363	31	0	2599	0	2599
32	0	3201	0	3201	32	0	3349	0	3349
33	487	1129	0	1617	33	0	1798	0	1798
34	0	909	0	909	34	0	4892	0	4892
35	1136	1090	0	2227	35	0	2657	0	2657
36	0	120	0	120	36	0	930	0	930
37	0	944	0	944	37	0	496	0	496
38	0	183	0	183	38	0	0	0	0
39	0	0	0	0	39	0	0	0	0
40+	0	80	0	80	40+	0	868	0	868
<b>TOTAL</b>	<b>641214</b>	<b>631328</b>	<b>2681</b>	<b>1275222</b>	<b>TOTAL</b>	<b>254371</b>	<b>317483</b>	<b>1302</b>	<b>573156</b>
<b>Ind. Sampled</b>	<b>2791</b>	<b>2712</b>	<b>11</b>	<b>5514</b>	<b>Ind. Sampled</b>	<b>641</b>	<b>802</b>	<b>13</b>	<b>1456</b>
<b>Samples</b>				<b>35</b>	<b>Samples</b>				<b>7</b>
<b>Catch (ton)</b>				<b>765</b>	<b>Catch (ton)</b>				<b>455</b>

**Table 18.** Roughhead grenadier Spanish catches length distribution for Div. 3LMNO.

<b>Roughhead Grenadier</b>		<b>3LMNO</b>		
<b>Length (cm)</b>	<b>Males</b>	<b>Females</b>	<b>Ind.</b>	<b>Total</b>
4	0	0	121	121
5	0	0	552	552
6	0	0	216	216
7	0	108	216	324
8	361	321	216	898
9	1410	305	108	1823
10	11995	6812	1409	20215
11	28917	17119	198	46234
12	45097	40227	1336	86660
13	50718	48464	0	99182
14	70615	58358	0	128974
15	104833	77615	0	182448
16	131735	125797	0	257533
17	146342	104414	0	250756
18	161403	139607	0	301010
19	117858	104976	0	222834
20	50939	72366	0	123305
21	16925	43775	0	60700
22	11816	36070	0	47886
23	6441	27306	0	33747
24	2294	26328	0	28622
25	5571	22141	0	27712
26	790	15007	0	15797
27	8039	9133	0	17172
28	3222	19205	0	22427
29	2502	9712	0	12214
30	0	7226	0	7226
31	1336	4110	0	5446
32	0	7189	0	7189
33	535	3213	0	3748
34	0	6366	0	6366
35	1247	4113	0	5360
36	0	1153	0	1153
37	0	1581	0	1581
38	0	200	0	200
39	0	0	0	0
40+	0	1041	0	1041
<b>TOTAL</b>	982941	1041358	4371	2028671
<b>Ind. Sampled</b>	3432	3514	24	6970
<b>Samples</b>				42
<b>Catch (ton)</b>				1339

**Table 19.** Roughhead grenadier Div. 3LMNO Spanish catches ages distribution, mean weight (g) and mean length (cm) by age.

Abundance					Mean Weight (gr)				
Age	Males	Females	Ind.	Total	Age	Males	Females	Ind.	Total
2			460	460	2			16	16
3	235	158	636	1030	3	77	51	27	42
4	2935	5626	710	9272	4	95	110	85	104
5	35782	44189	1456	81427	5	133	169	121	153
6	80196	87593	1032	168821	6	190	227	161	209
7	160868	156204	76	317148	7	283	330	169	306
8	165414	192017		357430	8	380	425		404
9	190406	206435		396841	9	498	568		535
10	166450	104717		271167	10	525	676		583
11	118690	80338		199028	11	654	879		745
12	30265	43493		73758	12	796	1075		961
13	14712	36642		51354	13	1057	1277		1214
14	10433	34771		45204	14	1542	1662		1634
15	3136	17826		20963	15	1943	2068		2050
16	948	6999		7947	16	2143	2357		2331
17	1126	12837		13963	17	2531	2680		2668
18	1296	6185		7481	18	3447	3304		3328
19	49	1930		1978	19	2932	3321		3312
20		2157		2157	20		3981		3981
21+		1241		1241	21+		4963		4963

  

Mean Length (cm)				
Age	Males	Females	Ind.	Total
2			5.4	5.4
3	9.5	8.1	6.4	7.4
4	10.2	10.7	9.8	10.5
5	11.4	12.4	11.0	12.0
6	12.9	13.7	12.3	13.3
7	14.9	15.7	12.5	15.3
8	16.5	17.1		16.8
9	18.1	18.9		18.5
10	18.4	20.1		19.1
11	19.8	22.0		20.7
12	21.1	23.5		22.5
13	23.2	25.0		24.5
14	26.6	27.4		27.2
15	29.0	29.6		29.5
16	30.0	31.0		30.9
17	31.8	32.4		32.3
18	35.4	34.9		35.0
19	33.5	34.9		34.9
20		37.2		37.2
21+		40.2		40.2

**Table 20.** Total biomass of the Spanish 3L Survey (Flemish Pass) in 2006, calculated by the swept area method, by species and stratum. (\*) Area outside of the Canadian ZEE.

Stratum	Greenland halibut	Redfish	Roughhead grenadier	Witch flounder	Black dogfish	American plaice	Cod	Thorny skate	Northern shrimp
385 (*)	162.2	-	-	2.5	-	500.7	18.4	62.4	2485.9
387 (*)	1194.7	2587.0	791.7	78.1	-	151.4	9.0	374.0	29967.4
388 (*)	1495.0	2081.8	832.4	27.6	-	240.1	221.5	1392.9	32585.1
389 (*)	1476.4	2062.0	63.9	12.7	-	922.5	474.3	1478.0	53639.3
390 (*)	930.9	13.5	-	5.7	-	5462.4	5.8	396.9	2578.0
391	442.0	178.9	4464.9	9.7	-	265.3	359.4	3787.3	3712.1
392	87.5	55365.5	1496.3	2.5	-	-	25.9	1895.3	194.0
729	398.8	3342.5	416.0	24.0	-	-	-	814.4	88.5
730	131.4	2281.1	832.7	7.2	57.7	-	-	68.0	1.5
731	316.0	361.8	199.6	64.5	-	-	-	887.9	177.4
732	136.4	117.1	460.2	28.4	-	-	-	41.8	14.5
733 (*)	382.8	1497.6	483.7	138.3	-	-	-	300.6	390.1
734 (*)	60.9	167.7	534.7	2.6	-	-	-	-	10.6
741 (*)	51.9	-	161.4	-	-	-	-	-	1.4
742 (*)	59.3	-	117.1	-	-	-	-	-	0.5
743 (*)	21.5	-	47.9	-	-	-	-	-	1.0
744 (*)	60.7	-	88.7	-	4.2	-	-	-	0.2
745	219.9	3.6	250.7	-	-	-	-	-	1.7
746	197.6	4.1	1455.3	-	314.8	-	-	-	0.1
747	280.2	0.0	2739.3	-	236.7	-	-	-	0.1
748	50.1	1.9	993.0	0.3	229.7	-	-	12.2	0.4
749	46.8	-	285.7	-	1003.9	-	-	-	0.1
750	500.0	-	839.8	-	309.4	-	-	19.6	0.1
751	92.3	-	85.8	-	22.3	-	-	-	-
<b>Total</b>	<b>8795.2</b>	<b>70066.0</b>	<b>17640.9</b>	<b>404.0</b>	<b>2178.6</b>	<b>7542.4</b>	<b>1114.3</b>	<b>11531.4</b>	<b>125849.6</b>

**Figure 1.-** Positions of the 2006 Spanish 3L (Flemish Pass) survey hauls.

